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Nishimura et al.

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(54) **INFORMATION PROCESSING EQUIPMENT AND METHOD FOR DETERMINING THE PRIORITY OF INPUT KEYS THEREOF**

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(51) **Int. Cl.**
G09G 5/00 (2006.01)

(52) **U.S. Cl.** **345/169**

(58) **Field of Classification Search** 345/168, 345/169, 172; 455/425; 707/7; 341/22
See application file for complete search history.

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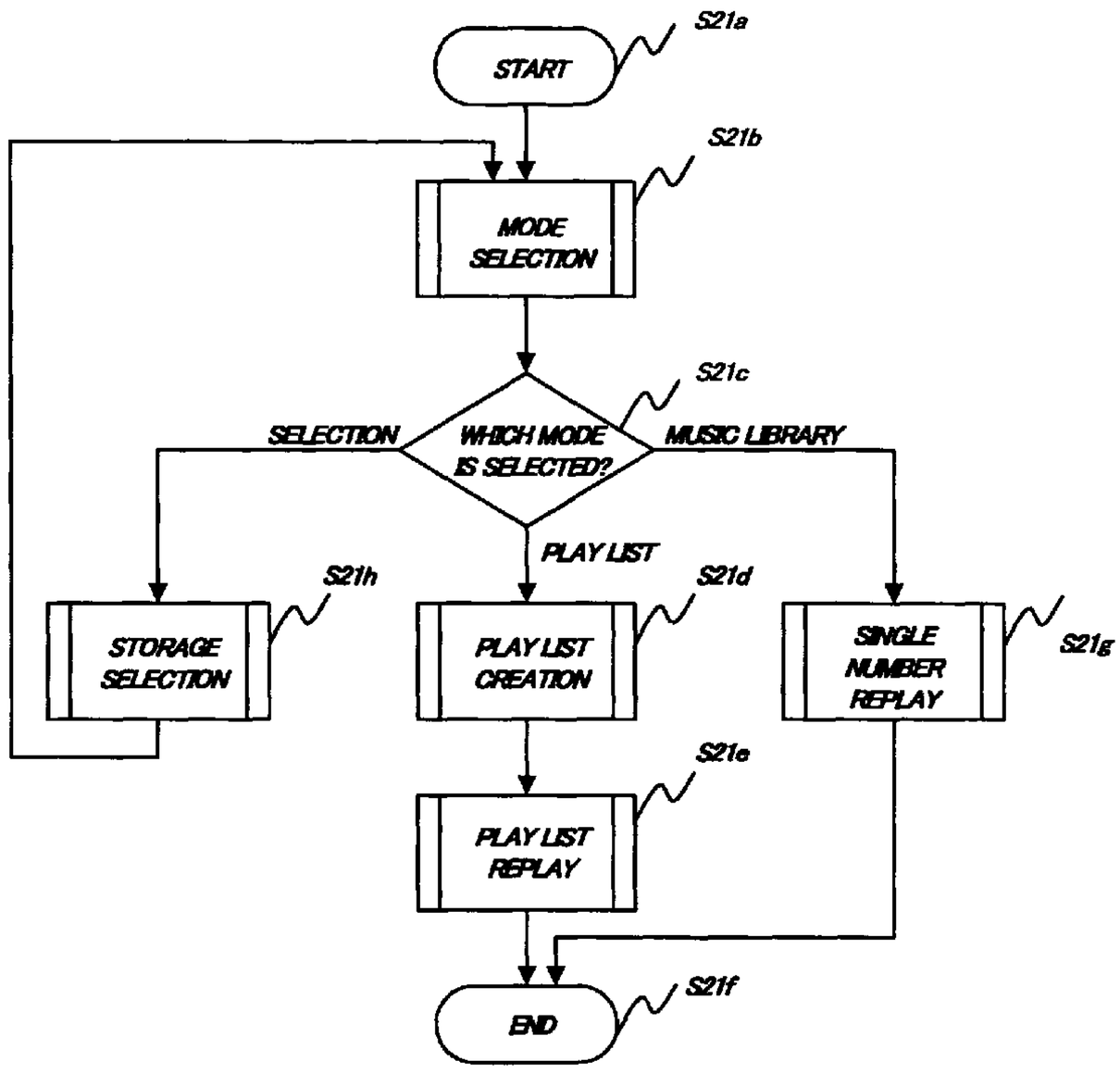
(57) **ABSTRACT**

Information processing equipment which changes the priority for operations executed in response to simultaneous manipulation of multiple keys in accordance with the operational stage in an application wherein the simultaneous manipulation is performed. Thus, an operation more suitable for the operational stage can be performed even if a user simultaneously manipulates multiple keys by mistake.

7 Claims, 7 Drawing Sheets



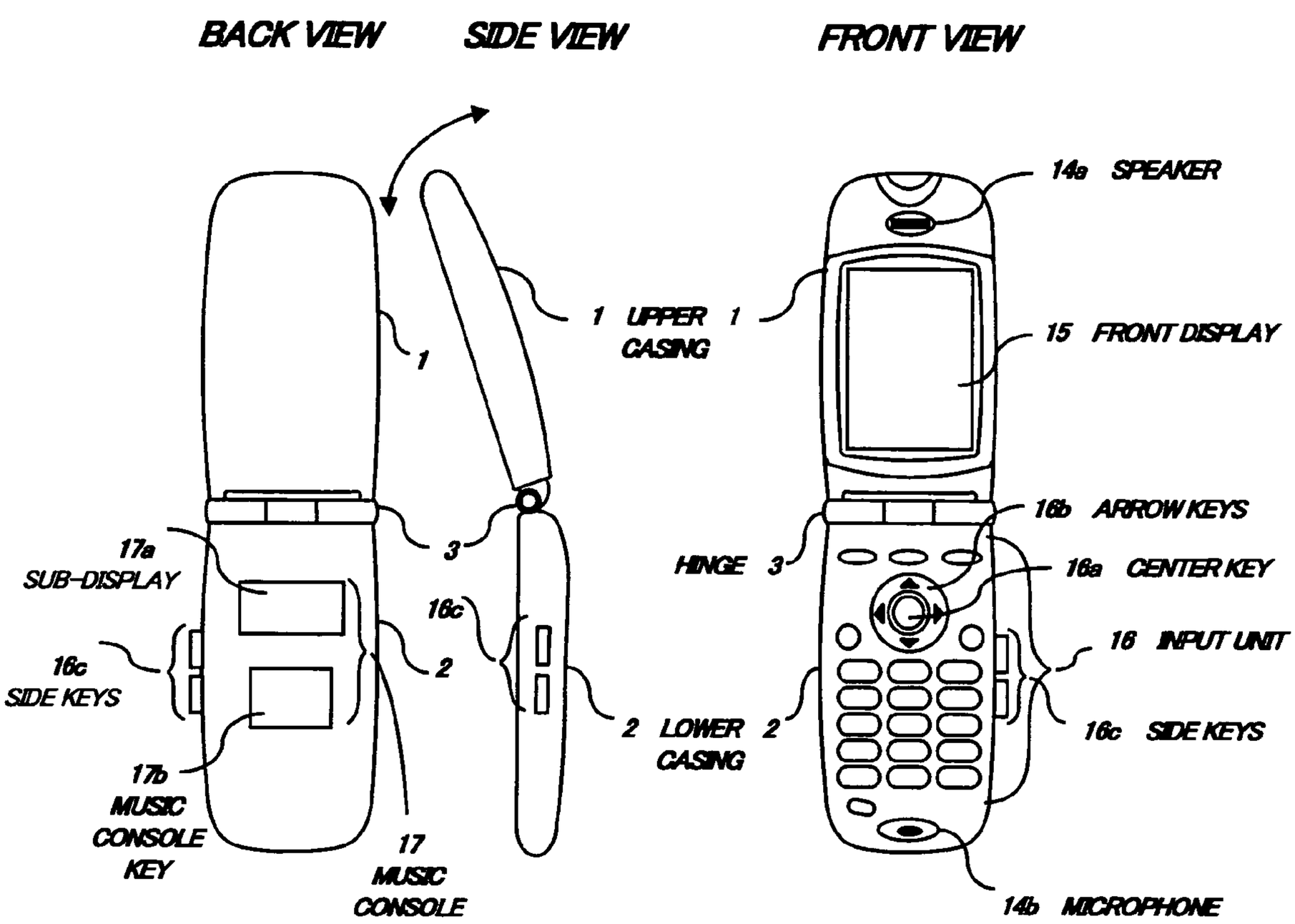

BACK VIEW
SIDE VIEW
FRONT VIEW
1
1 UPPER CASING
3
17a SUB-DISPLAY
16c SIDE KEYS
17b MUSIC CONSOLE KEY
17 MUSIC CONSOLE
16c
2
2 LOWER CASING
14a SPEAKER
1
15 FRONT DISPLAY
16b ARROW KEYS
HINGE 3
16a CENTER KEY
16 INPUT UNIT
2
16c SIDE KEYS
14b MICROPHONE

FIG. 1

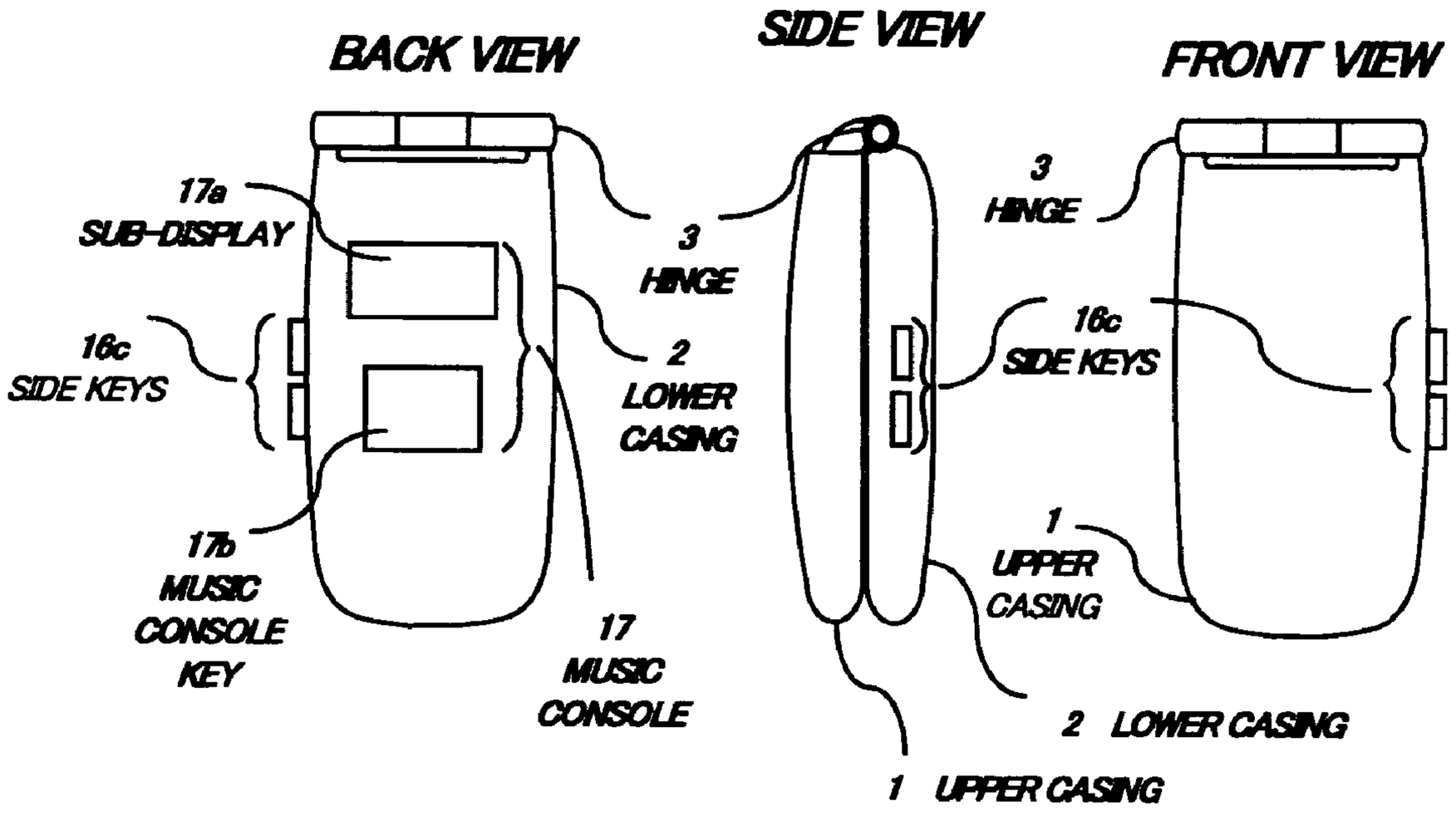

BACK VIEW
SIDE VIEW
FRONT VIEW
17a
SUB-DISPLAY
16c
SIDE KEYS
17b
MUSIC
CONSOLE
KEY
3
HINGE
2
LOWER
CASING
17
MUSIC
CONSOLE
3
HINGE
16c
SIDE KEYS
1
UPPER
CASING
2 LOWER CASING
1 UPPER CASING

FIG. 2

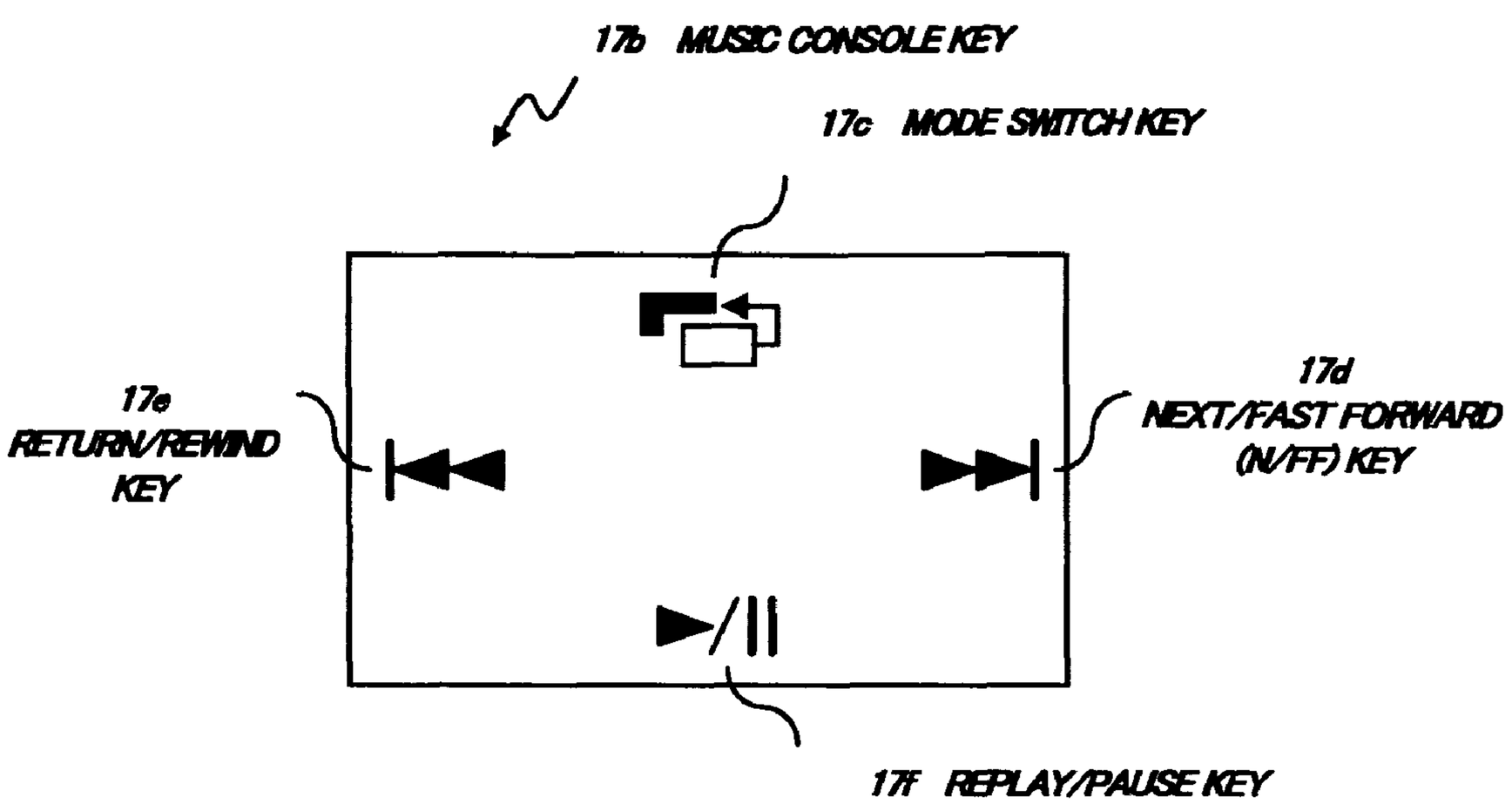

17b MUSIC CONSOLE KEY
17c MODE SWITCH KEY
17e RETURN/REWIND KEY
17d NEXT/FAST FORWARD (N/FF) KEY
17f REPLAY/PAUSE KEY

FIG. 3

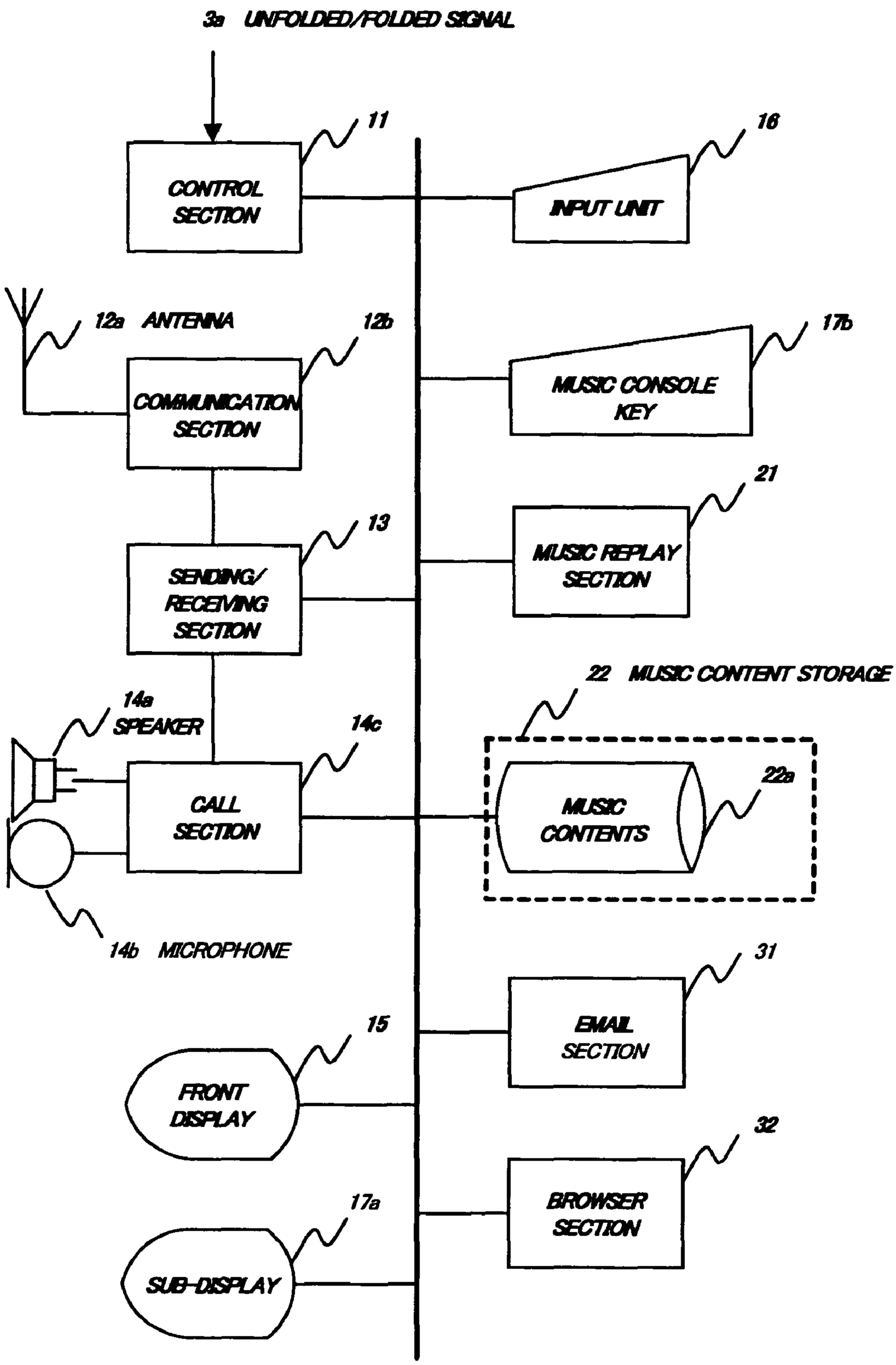

3a UNFOLDED/FOLDED SIGNAL
11
CONTROL SECTION
16
INPUT UNIT
12a ANTENNA
12b
COMMUNICATION SECTION
17b
MUSIC CONSOLE KEY
21
MUSIC REPLAY SECTION
13
SENDING/ RECEIVING SECTION
22 MUSIC CONTENT STORAGE
14a SPEAKER
14c
CALL SECTION
22a
MUSIC CONTENTS
14b MICROPHONE
31
EMAIL SECTION
15
FRONT DISPLAY
32
BROWSER SECTION
17a
SUB-DISPLAY

FIG. 4

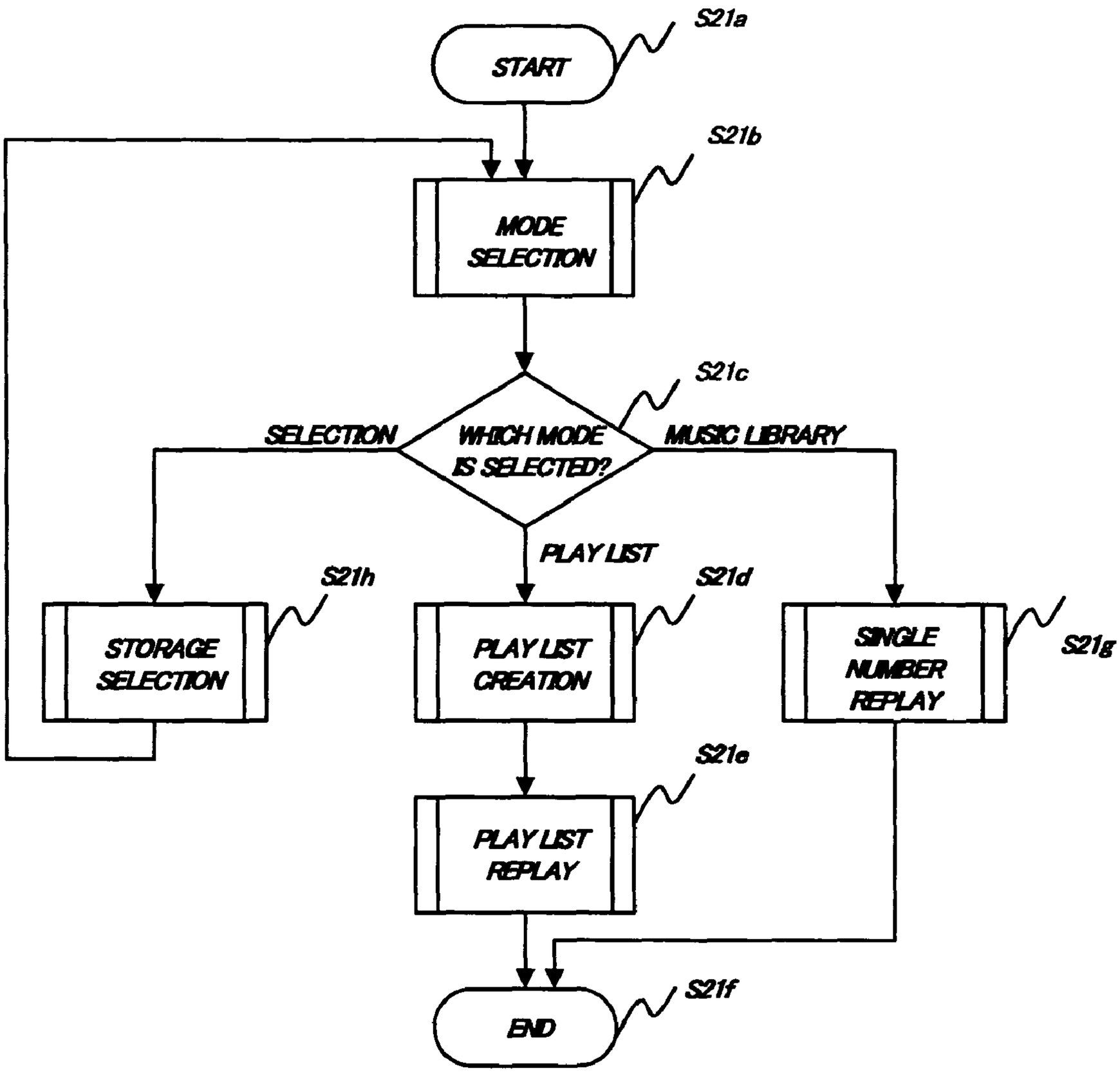

S21a
START
S21b
MODE SELECTION
S21c
WHICH MODE IS SELECTED?
SELECTION
MUSIC LIBRARY
PLAY LIST
S21h
STORAGE SELECTION
S21d
PLAY LIST CREATION
SINGLE NUMBER REPLAY
S21g
S21e
PLAY LIST REPLAY
S21f
END

FIG. 5

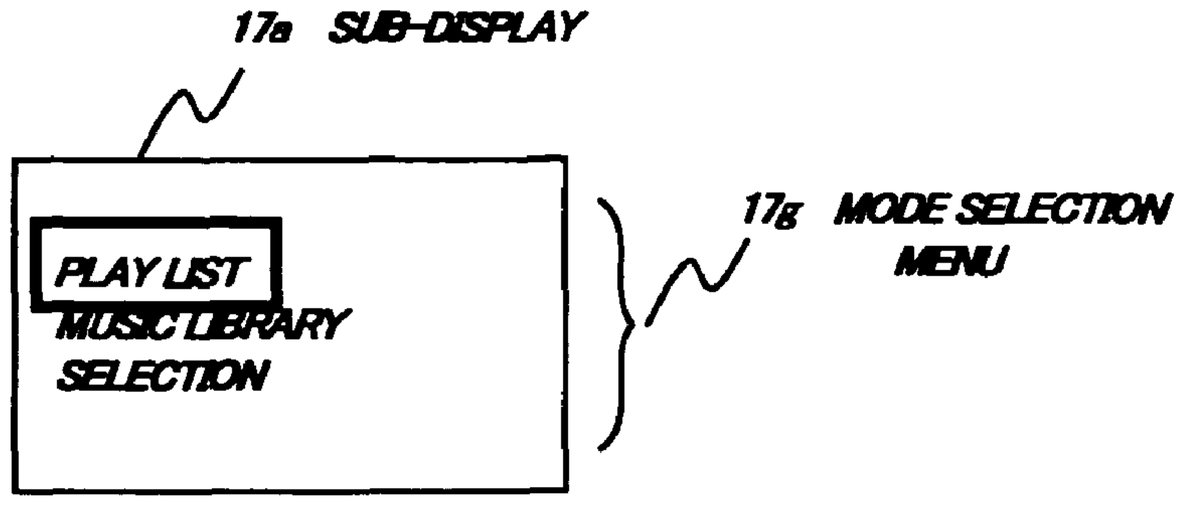


FIG. 6

21a KEY PRIORITY INFORMATION AT MODE SELECTION

21b PRIORITIZED KEY	21c SIMULTANEOUSLY INPUT KEYS
NEXT/FAST FORWARD KEY	MODE SWITCH KEY + NEXT/FAST FORWARD KEY
RETURN/REWIND KEY	MODE SWITCH KEY + RETURN/REWIND KEY
⋮	⋮

FIG. 7

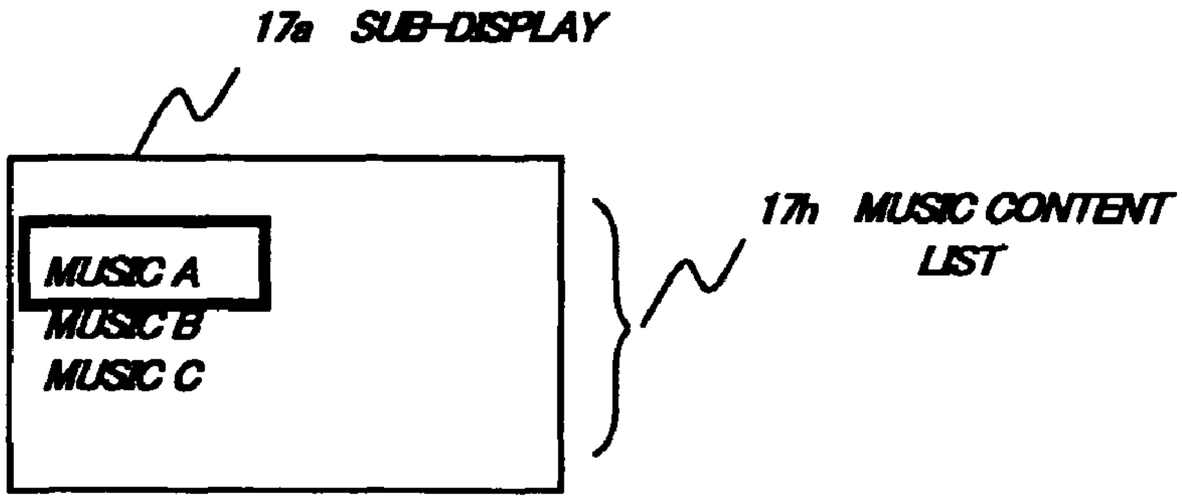


FIG. 8

21d KEY PRIORITY INFORMATION AT REPLAY

21e PRIORITIZED KEY	21f SIMULTANEOUSLY INPUT KEYS
N/FF KEY (LONG PRESSED)	MODE SWITCH KEY + NEXT/FAST FORWARD KEY
MODE SWITCH KEY	MODE SWITCH KEY + RETURN/REWIND KEY
MODE SWITCH KEY	NEXT/FAST FORWARD KEY + RETURN/REWIND KEY
⋮	⋮

FIG. 9

21g LONG PRESSED KEY PRIORITY INFORMATION AT REPLAY

21h PRIORITIZED KEY	21i SIMULTANEOUSLY INPUT KEYS
NEXT/FAST FORWARD KEY	MODE SWITCH KEY + NEXT/FAST FORWARD KEY
RETURN/REWIND KEY	MODE SWITCH KEY + RETURN/REWIND KEY
NEXT/FAST FORWARD KEY	NEXT/FAST FORWARD KEY + REPLAY/PAUSE KEY
RETURN/REWIND BUTTON	RETURN/REWIND KEY + REPLAY/PAUSE KEY
NEXT/FAST FORWARD KEY	NEXT/FAST FORWARD KEY + RETURN/REWIND KEY
REPLAY/PAUSE KEY	MODE SWITCH KEY + NEXT/FAST FORWARD KEY + RETURN/REWIND KEY + REPLAY/PAUSE KEY
⋮	⋮

FIG. 10

INFORMATION PROCESSING EQUIPMENT AND METHOD FOR DETERMINING THE PRIORITY OF INPUT KEYS THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based upon and claims the benefit of priority from the prior Japanese Patent Application No. 2005-285609, filed on Sep. 29, 2005; the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to information processing equipment, and more particularly to information processing equipment which can determine a user's intended operation when a plurality of keys are manipulated at a same time based on whether the plurality of keys are long pressed or short pressed, wherein the keys are used to control the operation of various functions of the information processing equipment.

2. Description of the Related Art

There have been small-sized information processing equipments which store a plurality of contents data for replay such as music contents. The music contents are coded music information and may include coded speech information, coded image information, etc. The information processing equipment is not limited to units exclusive for use in music replay. For example, the unit may be an information processing equipment with a music replay function.

The music replay function in the small-sized information processing equipment is usually controlled by manipulating small-sized keys to select items from multiple menus. A user of the unit might accidentally input multiple keys at the same time. Then, a process is known in which priority is assigned to individual keys and a key with the highest priority is assumed to be input when multiple keys are input at the same time while a predetermined application is being operated (for example, see Patent Reference 1).

The keys are electrical switches that are input depending on being pressed down but not limited thereto. They may be a touch panel, namely, a switch that is manipulated by finger touch. Simultaneous manipulation may occur with the touch panel when a position is touched between the positions that are defined to touch in correspondence with multiple switches.

Patent Reference 1: JP-UM-B-1-24659 (page 1, FIG. 3)

When the conditions in operation are changed by tracking multiple menus during the operation of one application, it is demanded to change the key that is assumed as it has been input among keys input the same time.

However, the method described in Patent Reference 1 has a problem that cannot cope with changing the key that is assumed as it has been input among the keys input at the same time depending on the conditions in operation. The problem is the same in information processing other than music replay.

BRIEF SUMMARY OF THE INVENTION

The present invention has been accomplished to solve the above-described problems. The object of the present invention is to provide information processing equipment which changes the priority for operations executed in response to simultaneous manipulation of multiple keys in accordance with the operational stage in an application wherein the simultaneous manipulation is performed.

To achieve this object, an aspect of the present invention is information processing equipment comprises an input unit having multiple keys, the unit which outputs multiple key identifiers when the multiple keys are simultaneously manipulated, and a processor which executes an operation in response to a key identifier predetermined in accordance with both a combination of the multiple key identifiers output through the simultaneous manipulation and an operation being executed by the processor when the multiple key identifiers are output at the simultaneous manipulation.

Another aspect of the present invention is information processing equipment comprises an input unit having multiple keys, the unit which outputs multiple key identifiers when the multiple keys are simultaneously manipulated, a processor which executes an operation in response to the output multiple key identifiers, and a memory which stores a key identifier predetermined in accordance with a combination of multiple key identifiers in association with an operation which the processor executes. The processor executes an operation in response to the key identifier predetermined in accordance with both a combination of the multiple key identifiers output through the simultaneous manipulation and an operation being executed by the processor when the multiple key identifiers are output at the simultaneous manipulation.

According to these aspects of the present invention, the information processing equipment can be provided which changes the priority for operations executed in response to simultaneous manipulation of multiple keys in accordance with the operational stage in an application wherein the simultaneous manipulation is performed. Thus, an operation more suitable for the operational stage can be performed even if a user simultaneously manipulates multiple keys by mistake.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWING

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention, and together with the general description given above and the detailed description of the embodiments given below, serve to explain the principles of the invention.

FIG. **1** is an appearance diagram showing a main configuration of information processing equipment with the upper and lower casings unfolded according to an embodiment of the present invention;

FIG. **2** is an appearance diagram showing the information processing equipment shown in FIG. **1** with the upper and lower casings folded;

FIG. **3** is an appearance diagram showing a music console key of the information processing equipment shown in FIG. **1**;

FIG. **4** is a block diagram showing the information processing equipment shown in FIG. **1**;

FIG. **5** is a flowchart showing the music replay operation controlled by a music replay section of the information processing equipment shown in FIG. **1**;

FIG. **6** is an exemplary mode selection menu displayed by a music replay section of the information processing equipment shown in FIG. **1**;

FIG. **7** is exemplary key priority information at mode selection displayed by a music replay section of the information processing equipment shown in FIG. **1**;

FIG. **8** is an exemplary music content list displayed by a music replay section of the information processing equipment shown in FIG. **1**;

FIG. **9** is exemplary key priority information at replay displayed by a music replay section of the information processing equipment shown in FIG. **1**; and

FIG. **10** is exemplary long pressed key priority information at replay displayed by a music replay section of the information processing equipment shown in FIG. **1**.

DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention will be explained below with reference to the accompanying drawings.

FIG. **1** is an appearance diagram showing a main configuration of information processing equipment with the upper and lower casings unfolded according to an embodiment of the present invention. The equipment may be a mobile communication terminal device which replays music. FIG. **1** comprises a back view, a side view and a front view. In the information processing equipment, the upper casing **1** and the lower casing **2** are rotatably connected to each other with a hinge **3**.

On the inner surface of the upper casing **1**, a speaker **14***a* is disposed which is used for receiving speech, and a front display **15** formed of an LCD (Liquid Crystal Display) with a backlight is disposed which is used for display to encourage a user to operate, and to show the descriptions of manipulations done by the user, a cursor position, and the operational state of the equipment.

In addition, on the inner surface of the lower casing **2**, a microphone **14***b* is disposed which is used for talk. On the inner surface and the side surface of the lower casing **2**, an input unit **16** formed of keypads is disposed. Moreover, the inner surface of the lower casing **2**, an antenna (not shown) is disposed which is used for sending and receiving radio waves.

Furthermore, on the outer surface of the lower casing **2**, a music console **17** is disposed. The music console **17** has a sub-display **17***a* formed of an LCD (Liquid Crystal Display) with a backlight which is used for display to encourage a user to operate regarding music replay, and to show the descriptions of manipulations done by the user, a cursor position, and the operational state of the equipment, and has a music console key **17***b* which is used for entering operation instructions regarding music replay.

The input unit **16** is disposed on the inner surface of the lower casing **2**, and includes a center key **16***a* which is used for instructing acceptance and selection in each function, and arrow keys **16***b* which are placed adjacently to the center key **16***a* to surround the center key **16***a*, and used for instructing the cursor position to move on the front display **15**.

Furthermore, the input unit **16** includes numeric keys which are used for entering alphanumeric characters, letters, and symbols; multiple function keys which are used for entering operation instructions such as turning power on and off the information processing equipment; and multiple side keys **16***c* which are placed on the side surface of the lower casing **2**.

Moreover, on the hinge **3**, an unfolded/folded detecting section (not shown) is disposed which detects whether the upper and lower casings **1** and **2** are unfolded or folded, and an unfolded/folded signal is output from the unfolded/folded detecting section.

FIG. **2** is an appearance diagram showing the information processing equipment with the upper and lower casings folded. FIG. **2** comprises a back view, a side view and a front view similarly to FIG. **1**. In the state that the upper and lower casings **1** and **2** are folded, indications on the front display **15** placed on the inner surface of the upper casing **1** cannot be visibly recognized, and the keys of the input unit **16** arranged on the inner surface of the lower casing **2** cannot be manipulated.

FIG. **3** is an appearance diagram showing a music console key of the information processing equipment. The music console key **17***b* is formed of an almost rectangular flexible plate material hardly damaged, on which two rectangles are depicted at the center part near the upper part and an arrow that connects the rectangles is depicted, which indicate a mode switch key **17***c*. Here, the rectangles symbolize selection operations by menus.

Furthermore, the two rightward arrows are depicted at the center part near the right part, which indicate a next/fast forward key **17***d*. Moreover, two leftward arrows are depicted at the center part near the left part, which indicate a return/rewind key **17***e*. Moreover, a single rightward arrow and two vertical bars are depicted at the center part near the lower part, which indicate a replay/pause key **17***f*.

Here, the rightward arrows represent the operation in the replay direction. A single rightward arrow symbolizes the replay operation, and two rightward arrows symbolize the fast forward operation. Furthermore, a single leftward arrow represents the operation in the reverse direction to the replay direction, and two leftward arrows symbolize the rewind operation. Moreover, the vertical bars symbolize stopping replay.

In addition, the mode switch key **17***c* is sometimes used as a key to move the cursor up, and the replay/pause key **17***f* is sometimes used as a key to move the cursor below. Furthermore, the next/fast forward key **17***d* is sometimes used as a key to select an item represented by a line on which the cursor is placed, and the return/rewind key **17***e* is sometimes used as a key to return to the menu one stage above.

Below each of the keys **17***c* to **17***f*, an electrical switch (not shown) is disposed. A certain switch is conducted to detect that a key corresponding to that switch has been pressed down. Furthermore, a certain switch is not conducted to detect that a key corresponding to that switch is not pressed down. Then, the keys **17***c* to **17***f* have the same functions as keys.

Here, only a single key among the keys **17***c* to **17***f* is not always pressed down. Two adjacent keys among the keys **17***c* to **17***f* are sometimes pressed down at the same time. In addition to this, since the music console key **17***b* is formed of a flexible plate material, two or three given keys might be pressed down at the same time, and all four keys might be pressed down at the same time.

FIG. **4** is a block diagram showing the information processing equipment. The information processing equipment is formed of a control section **11** to which an unfolded/folded signal **3***a* is input to control the device overall, an antenna **12***a* which sends and receives radio waves with a base station (not shown), a communication section **12***b*, a sending/receiving section **13**, the speaker **14***a* for receiving speech and for music replay, the microphone **14***b* for talk, a call section **14***c*, the front display **15**, the sub-display **17***a*, the input unit **16**, the music console key **17***b*, a music replay section **21**, a music content storage **22**, an email sending/receiving section **31** which sends and receives email, and a browser section **32** which makes access to web pages.

The music content storage **22** is stored with a single or multiple music contents **22***a*. The music contents **22***a* stored in the music content storage **22** are information that speech information is coded. Then, the music contents **22***a* are those received as an attached file received by the email sending/receiving section **31**, and those downloaded by the browser section **32**, but not limited thereto.

In addition, the music contents **22***a* may include information that image information is coded other than information that speech information is coded. Furthermore, they may include character information about the music contents **22***a*.

The operation of each part of the information processing equipment of the embodiment according to the invention thus configured will be described with reference to FIG. **4**.

The communication section **12***b* outputs a high frequency signal received at the antenna **12***a* to the sending/receiving section **13**, and sends a high frequency signal output at the sending/receiving section **13** from the antenna **12***a*.

The sending/receiving section **13** amplifies, frequency converts, and demodulates the high frequency signal from the communication section **12***b*, and sends a digital speech signal thus obtained to the call section **14***c*, and sends a control signal to the control section **11**. Furthermore, it modulates, frequency converts, and amplifies the digital speech signal output from the call section **14***c*, and the control signal output from the control section **11**, obtains a high frequency signal, and sends it to the communication section **12***b*.

The call section **14***c* converts and amplifies the digital speech signal output from the sending/receiving section **13** to an analog speech signal, and sends it to the speaker **14***a*. Moreover, it amplifies and converts an analog speech signal output from the microphone **14***b* to a digital speech signal, and sends it to the sending/receiving section **13**.

The front display **15** is controlled by the control section **11** to display characters, numerics and image data when it is detected with the unfolded/folded signal **3***a* that the upper and lower casings **1** and **2** are unfolded. The displayed data is switched by receiving an instruction from the control section **11** in response to input manipulation from the input unit **16** and an incoming signal.

The sub-display **17***a* is controlled by the control section **11** to display characters, numerics and image data when it is detected with the unfolded/folded signal **3***a* that the upper and lower casings **1** and **2** are folded. The displayed data is switched by receiving an instruction from the control section **11** in response to input manipulation from the music console key **17***b* and an incoming signal.

The input unit **16** is formed of keys including numeric keys which specify a telephone number of a person to communicate and of multiple function keys. Then, when a key on the input unit **16** is manipulated, the key's identifier is notified to the control section **11**, and the control section **11** allows the front display **15** to display it as a character, or performs control.

When a given number of the keys are manipulated among four the keys **17***c* to **17***f* of the music console key **17***b*, the identifiers of all the keys having been manipulated are notified to the music replay section **21** through the control section **11**. Moreover, the control section **11** notifies the music replay section **21** that it is a short press in addition to the key's identifier when the manipulation is done within a predetermined time period, and it notifies the music replay section **21** that it is a long press in addition to the key's identifier when the manipulation is done over a predetermined time period.

The music replay section **21** displays a list of the music contents **22***a* on the front display **15** or the sub-display **17***a*. Then, when a predetermined key of the input unit **16** or the music console key **17***b* is input, a single or multiple music contents **22***a* are selected from the list, and the selected music content **22***a* is replayed.

Hereinafter, a music replay control operation using the music console key **17***b* of the information processing equipment according to the embodiment will be described. FIG. **5** is a flow chart illustrating the music replay control operation using the music console key **17***b* of the music replay section **21**.

When a predetermined function key of the input unit **16** disposed on the inner surface of the lower casing **2** is manipulated in the state that the upper and lower casings **1** and **2** are unfolded, the control section **11** is activated to start the operation of the music replay section **21**. After the upper and lower casings **1** and **2** are folded, the control operation of music replay done by the keys **17***c* to **17***f* of the music console key **17***b* is started (step S**21***a*).

Furthermore, when a predetermined side key **16***c* disposed on the side surface of the lower casing **2** is input in the state that the upper and lower casings **1** and **2** are folded, the control section **11** is activated to start the operation of the music replay section **21**. The control operation of music replay done by the keys **17***c* to **17***f* of the music console key **17***b* is started (step S**21***a*).

Subsequently, the music replay section **21** performs a mode selection operation (step S**21***b*). More specifically, it displays a mode selection menu formed of a mode list of the sub-display **17***a*. FIG. **6** shows an exemplary mode selection menu. In this mode selection menu **17***g*, characters are shown that indicate three modes, "PLAY LIST", "MUSIC LIBRARY" and "SELECTION" in three lines.

Then, the cursor is placed on one line among the three lines, and that line is displayed in the form different from others. In the initial state that the mode selection menu **17***g* is displayed, the cursor is placed on the "PLAY LIST" at the first line. In addition, for different display forms, there are indications in different colors, and indications flashed, but not limited thereto. It is fine as long as a line can be distinguished from the other lines. In the example shown in FIG. **6**, characters "PLAY LIST" are shaded to indicate that the cursor is placed on the characters "PLAY LIST".

Here, when the mode switch key **17***c* is input, the music replay section **21** moves the line on which the cursor is placed to a line above. Moreover, when the replay/pause key **17***f* is input, it moves the line on which the cursor is placed to a line below.

Furthermore, when the next/fast forward key **17***d* is input, the music replay section **21** selects the mode indicated by the line on which the cursor is placed. When the return/rewind key **17***e* is input, the music replay section **21** ends the operation.

When keys are input at the same time during the mode selection operation at step S**21***b*, that is, multiple keys are pressed down at the same time, the music replay section **21** prioritizes a particular key, and assumes that that particular key has been input in accordance with key priority information at mode selection stored in the music replay section **21**. Then, it performs the control operation at the time when that particular key has been input. FIG. **7** shows exemplary key priority information at mode selection. The key priority information at mode selection **21***a* is formed of a set of information associating a prioritized key **21***b* with simultaneous input keys **21***c*.

Then, the next/fast forward key as the prioritized key **21***b* is associated with the mode switch key+next/fast forward key as the simultaneous input keys **21***c* for storage. It is stored that the next/fast forward key **17***d* is assumed as it has been input when the mode switch key **17***c* and the next/fast forward key **17***d* are input at the same time.

Furthermore, the return/rewind key as the prioritized key **21***b* is associated with the mode switch key+return/rewind key as the simultaneous input keys **21***c* for storage. It is stored

that the return/rewind key **17***e* is assumed as it has been input when the mode switch key **17***c* and the return/rewind key **17***e* are input at the same time.

In the process that the mode switch key **17***c* is not prioritized, since the cursor is placed on the "PLAY LIST" at the first line in the initial state that the mode selection menu **17***g* is displayed, the mode switch key **17***c* does not need to be input. When multiple keys including the mode switch key **17***c* are input at the same time, it is proper to ignore the input of the mode switch key **17***c* not required.

The music replay section **21** branches the operation depending on the selected mode at step S**21***b* (step S**21***c*). When the "PLAY LIST" is selected as a mode, the music replay section **21** replays the music contents **22***a* in accordance with a play list, that is, the list of the identifiers of the multiple music contents **22***a* in this order, and thus it first creates a play list (step S**21***d*).

More specifically, the list of the music contents **22***a* stored in the music content storage **22** is displayed on the sub-display **17***a*. FIG. **8** shows an exemplary music content list. The music content list **17***h* is formed of multiple lines. A single line represents information that identifies the music content **22***a*, for example, it represents a name of the music content **22***a*. In the example shown in FIG. **7**, it indicates that music contents **22***a* named by "music A", "music B" and "music C" are stored in the music content storage **22**.

Then, the cursor is placed on one line among the three lines, and that line is indicated in the form different from the others. In the initial state that the music content list **17***h* is indicated, the cursor is placed at the first line (in the example shown in FIG. **8**, on "music A"). In addition, for different display forms, there are indications in different colors, and indications flashed, but not limited thereto. It is fine as long as a line can be distinguished from the other lines. In the example shown in FIG. **8**, characters "music A" are shaded to indicate that the cursor is placed on the line of characters "music A".

Here, when the mode switch key **17***c* is input, the music replay section **21** moves the line to which the cursor is placed one line above. Furthermore, when the replay/pause key **17***f* is input, it moves the line to which the cursor is placed one line below.

In addition, when many music contents **22***a* are stored in the music content storage **22**, information that identifies all the music contents **22***a* might not be shown on the sub-display **17***a*. In this case, the music replay section **21** shows information that identifies a part of the music contents **22***a*, and the information that identifies the music contents **22***a* shown is scrolled in accordance with the manipulation of the mode switch key **17***c* and the replay/pause key **17***f*.

Furthermore, the next/fast forward key **17***d* is manipulated, the music replay section **21** adds the identifier of a music content **22***a* indicated by the line on which the cursor is placed to the end of the play list. When the play list is empty, a play list formed of that identifier is created.

In this manner, when the mode switch key **17***c*, the replay/pause key **17***f*, and the next/fast forward key **17***d* are used to create the play list and the return/rewind key **17***e* is then input, the music replay section **21** ends the creation of the play list. Then, a play list replay operation by the created play list, that is, the operation is done in which the music contents **22***a* whose identifiers are stored in the play list are replayed in order of being stored (step S**21***e*). More specifically, the music contents **22***a* are read from the music content storage **22**, and coded them, and music is played from the speaker **14***a* to end the control operation (step S**21***f*).

In the play list replay operation at step S**21***e*, the music replay section **21** displays the list of information that identifies the music contents **22***a* stored in the play list on the sub-display **17***a*, and displays information that identifies the music content **22***a* being replayed in the display form different from information that identifies the others.

In the play list replay operation at step S**21***e*, one key is input among the keys **17***c* to **17***f* of the music console key **17***b*, and then the music replay section **21** performs the control operation below. More specifically, when the Mode switch key **17***c* is input, the music replay section **21** performs the control operation of mode selection at step S**21***b* while it continues the play list replay operation (not shown). Then, subsequently to the mode selection, the play list replay operation continued is finished before the play list replay operation at step S**21***e* or the operation of replaying a single number at step S**21***g*, described later.

When the next/fast forward key **17***d* is manipulated for a short time, the music replay section **21** finishes the replay of a music content **22***a* being replayed, and replays a music content **22***a* that is identified by the identifier stored next to the identifier of the music content **22***a* being replayed in the play list. When the next/fast forward key **17***d* is manipulated for a long time, the music replay section **21** fast forwards the music content **22***a* being replayed.

When the return/rewind key **17***e* is manipulated for a short time, the music replay section **21** finishes the replay of the music content **22***a* being replayed, and replays a music content **22***a* that is identified by the identifier stored before the identifier of the music content **22***a* being replayed in the play list. When the return/rewind key **17***e* is manipulated for a long time, the music replay section **21** rewinds the music content **22***a* being replayed.

When the replay/pause key **17***f* is manipulated for a short time, the music replay section **21** pauses the replay of the music content **22***a* being replayed. In the case where replay is paused, when the replay/pause key **17***f* is manipulated for a short time, the music replay section **21** restarts the replay of the paused music content **22***a*. When the replay/pause key **17***f* is manipulated for a long time, the music replay section **21** finishes the replay of the music content **22***a*, finishes display on the sub-display **17***a*, and ends the control operation (not shown).

In the play list replay operation at step S**21***e*, multiple keys among the keys **17***c* to **17***f* of the music console key **17***b* are input at the same time, and then the music replay section **21** prioritizes a particular key and assumes that that particular key has been input in accordance with short press key priority information at replay and long press key priority information at replay stored in the music replay section **21**. Then, it performs the control operation at the time when that particular key has been input. FIG. **9** shows exemplary short press key priority information at replay. The short press key priority information at replay **21***d* is formed of a set of information associating a prioritized key **21***e* with simultaneous input keys **21***f*.

Then, a long press of the next/fast forward key as the prioritized key **21***e* is associated with the mode switch key+next/fast forward key as the simultaneous input keys **21***f* for storage. It is stored that the next/fast forward key **17***d* is assumed as it has been manipulated for a long time when the mode switch key **17***c* and the next/fast forward key **17***d* are manipulated for a short time at the same time. By the stored correspondence, a fast forward process is prioritized than the process of new mode selection.

Furthermore, the mode switch key as the prioritized key **21***e* is associated with the mode switch key+return/rewind key as the simultaneous input keys **21***f* for storage. It is stored that the mode switch key **17***c* is assumed as it has been

manipulated for a short time when the mode switch key **17***c* and the return/rewind key **17***e* are manipulated for a short time at the same time. By the stored correspondence, a new mode selection process is prioritized than the process of replaying the music content **22***a* stored before the music content **22***a* being replayed in the play list.

Moreover, the mode switch key as the prioritized key **21***e* is associated with the next/fast forward key+return/rewind key as the simultaneous input keys **21***f* for storage. It is stored that the mode switch key **17***c* is assumed as it has been manipulated for a short time when the next/fast forward key **17***d* and the return/rewind key **17***e* are manipulated for a short time at the same time. By the stored correspondence, a new mode selection process is prioritized when manipulation of replay is done in the opposite direction.

FIG. **10** shows exemplary long press key priority information at replay. The long press key priority information at replay **21***g* is formed of a set of information associating a prioritized key **21***h* with simultaneous input keys **21***i*.

Then, the next/fast forward key as the prioritized key **21***h* is associated with the mode switch key+next/fast forward key as the simultaneous input keys **21***i* for storage. It is stored that the next/fast forward key **17***d* is assumed as it has been manipulated for a long time when the mode switch key **17***c* and the next/fast forward key **17***d* are pressed for a long time at the same time. By the stored correspondence, a fast forward process, that is, a process of continuing replay is prioritized than the process of new mode selection.

Furthermore, the return/rewind key as the prioritized key **21***h* is associated with the mode switch key+return/rewind key as the simultaneous manipulation keys **21***i* for storage. It is stored that the return/rewind key **17***e* is assumed as it has been manipulated for a long time when the mode switch key **17***c* and the return/rewind key **17***e* are pressed for a long time at the same time. By the stored correspondence, a rewind process, that is, a process of continuing replay is prioritized than the process of new mode selection.

Moreover, the next/fast forward key as the prioritized key **21***h* is associated with the next/fast forward key+replay/pause key as the simultaneous input keys **21***i* for storage. It is stored that the next/fast forward key **17***d* is assumed as it has been manipulated for a long time when the next/fast forward key **17***d* and the replay/pause key **17***f* are pressed for a long time at the same time. By the stored correspondence, a fast forward process, that is, a process of continuing replay is prioritized than finishing music replay.

Furthermore, the return/rewind key as the prioritized key **21***h* is associated with the return/rewind key+replay/pause key as the simultaneous manipulation keys **21***i* for storage. It is stored that the return/rewind key **17***e* is assumed as it has been manipulated for a long time when the return/rewind key **17***e* and the replay/pause key **17***f* are pressed for a long time at the same time. By the stored correspondence, a rewind process is prioritized than a process of finishing music replay.

Moreover, the next/fast forward key as the prioritized key **21***h* is associated with the next/fast forward key+return/rewind key as the simultaneous input keys **21***i* for storage. It is stored that the next/fast forward key **17***d* is assumed as it has been manipulated for a long time when the next/fast forward key **17***d* and the return/rewind key **17***e* are pressed for a long time at the same time. By the stored correspondence, when manipulation is done that replays in the opposite directions, a process of replay in the forward direction is prioritized.

Furthermore, the replay/pause key as the prioritized key **21***h* is associated with the mode switch key+next/fast forward key+return/rewind key+replay/pause key as the simultaneous input keys **21***i* for storage. It is stored that the replay/pause key **17***f* is assumed as it has been manipulated for a long time when the mode switch key **17***c*, the next/fast forward key **17***d*, the return/rewind key **17***e*, and the replay/pause key **17***f* are pressed for a long time at the same time. By the stored correspondence, when manipulation usually impossible is done such as all the keys being manipulated, a process of finishing music replay is prioritized.

When the selected mode is "MUSIC LIBRARY" at step S**21***c*, the music replay section **21** replays one of the music contents **22***a* stored in the music content storage **22** (step S**21***g*), and it ends the control operation (step S**21***f*).

More specifically, as similar to the case where the "PLAY LIST" is selected, the list of the music contents **22***a* stored in the music content storage **22** is shown on the sub-display **17***a*, and the cursor is moved on one among them by the mode switch key **17***c* and the replay/pause key **17***f*. When the next/fast forward key **17***d* is input, the music content **22***a* indicated by the line on which the cursor is placed is replayed. In addition, when the return/rewind key **17***e* is input, the music replay section **21** returns to the mode selection operation (not shown).

In the single number replay operation at step S**21***g*, the music replay section **21** shows the name of the music content **22***a* being replayed on the sub-display **17***a*.

In the single number replay operation at step S**21***g*, one key among the keys **17***c* to **17***f* of the music console key **17***b* is input, and then the music replay section **21** performs the same control operation as the control operation in the case where one key is input among the keys **17***c* to **17***f* of the music console key **17***b* in the play list replay operation at step S**21***e*. However, since the play list is not set in single number replay, the control operation is not done when the next/fast forward key **17***d* is manipulated for a short time. Furthermore, when the return/rewind key **17***e* is manipulated for a short time, the mode selection menu **17***g* that is a screen right before is shown on the sub-display **17***a*.

In the single number replay operation at step S**21***g*, multiple keys among the keys **17***c* to **17***f* of the music console key **17***b* are input at the same time, the music replay section **21** performs the same control operation as the control operation in the case where one key is input among the keys **17***c* to **17***f* of the music console key **17***b* in the play list replay operation at step S**21***e* described above, in accordance with the short press key priority information at replay **21***d* and the long press key priority information at replay **21***g* stored in the music replay section **21**, and a predetermined key is assumed as it has been input.

In the case where the selected mode is "SELECTION" at step S**21***c*, when the music content storage **22** is split into multiple storages, for example, it is split into a storage inside the unit and a removable storage medium, the music replay section **21** shows the list of the storages to be split on the sub-display **17***a*, it selects one among them as similar to the case where the "MUSIC LIBRARY" is selected (step S**21***h*), and moves to the mode selection operation at step S**21***b*. Then, after that, at step S**21***d* or step S**21***g*, it shows information that identifies the music contents **22***a* stored in the selected storage.

In the description above, the music replay section **21** outputs decoded music from the speaker **14***a* which outputs received speeches, but it is not limited thereto. The unit may have a second speaker for music replay (not shown), and the music replay section **21** may output decoded music from the second speaker.

Furthermore, in the description above, the music console key **17***b* is formed of an almost rectangular flexible plate material, but it is not limited thereto. For example, it may be

formed of an almost circular flexible plate material. Moreover, for example, it may be formed of a donut-shaped flexible plate material which does not include the center part.

Furthermore, electrical switches are placed below the keys **17***c* to **17***f* of the music console key **17***b*, and the switches are conducted to detect whether the keys **17***c* to **17***f* are input, but it is not limited thereto. For example, the music console key **17***b* may be formed of an almost rectangular touch panel, and it may be detected whether any one of four keys is input depending on a finger touching near four sides of that rectangle.

Moreover, when it is detected that a finger touches the position at the nearly equal distance from two adjacent sides, it is determined that keys corresponding to these two sides have been input at the same time. Furthermore, when it is detected that a finger touches the center part of that almost rectangle, it is determined that all the four keys have been input at the same time. Here, the touch panel may be a touch screen. Moreover, it may be a pressure-sensitive type, or may be an electrostatic type.

In addition, in the description above, the music contents **22***a* are coded speech information, but it is not limited thereto. When the music contents **22***a* include coded video information, the music replay section **21** decodes coded video information, and shows them on the sub-display **17***a* in replay of the music contents **22***a*. Furthermore, when the music contents **22***a* include character information, the music replay section **21** shows the character information on the sub-display **17***a* in replay of the music contents **22***a*.

Moreover, in the description above, the music console key **17***b* is disposed on the lower casing **2**, but it is not limited thereto. It may be disposed on the upper casing **1**. Furthermore, the information processing equipment may have headphones for music replay (not shown) connected to the upper casing **1** or the lower casing **2** with a signal line cable, and the music console key **17***b* may be disposed on the midway of that cable. Moreover, the music console key **17***b* may communicate with the information processing equipment with radio in a short-range radio communication mode, for example, infrared rays.

Furthermore, in the description above, the key priority information at mode selection **21***a*, the short press key priority information at replay **21***d*, and the long press key priority information at replay **21***g* are stored in the music replay section **21** in the table form, but they are not limited thereto. For example, when the music replay section **21** performs the control operation by a program, the information may be incorporated in that program.

Moreover, in the description above, the example is taken and described in the form that the invention is adapted to a information processing equipment which replays music, but the invention of course can be adapted to any given devices that replay music such as a device exclusive for use in music replay, a PDA (Personal Digital Assistant), and a personal computer. Besides, the invention can be adapted to devices having functions in addition to the function of music replay. The invention is not limited to the configurations above, which can be modified variously.

What is claimed is:

1. Information processing equipment, comprising:

an input unit having multiple keys, wherein the input unit outputs multiple key identifiers when a plurality of the multiple keys are simultaneously manipulated, and wherein the input unit outputs the multiple key identifiers along with press time information indicating whether the multiple keys are short pressed or long pressed when the multiple keys are simultaneously manipulated; and

a processor for executing an operation in response to a key identifier predetermined in accordance with both: (i) the multiple key identifiers and the press time information output in response to the simultaneous manipulation and (ii) an operation being executed by the processor when the multiple key identifiers are output in response to the simultaneous manipulation.

2. The equipment of claim **1**, wherein the predetermined key identifier corresponds to one of the plurality of simultaneously manipulated keys.

3. Information processing equipment, comprising:

an input unit having multiple keys, wherein the input unit outputs multiple key identifiers when a plurality of the multiple keys are simultaneously manipulated, and wherein the input unit outputs the multiple key identifiers along with press time information indicating whether the multiple keys are short pressed or long pressed when the multiple keys are simultaneously manipulated;

a processor for executing an operation in response to a key identifier predetermined in accordance with both: (i) the multiple key identifiers and the press time information output in response to the simultaneous manipulation and (ii) an operation being executed by the processor when the multiple key identifiers are output in response to the simultaneous manipulation; and

a memory for storing the predetermined key identifier in correspondence with the combination of: (i) the multiple key identifiers and the press time information and (ii) the operation being executed by the processor.

4. The equipment of claim **3**, wherein the predetermined key identifier corresponds to one of the plurality of simultaneously manipulated keys.

5. Information processing equipment, comprising:

an input unit having keys; and

a processor configured to execute an operation in response to a manipulation of at least one of the keys of the input unit;

wherein the input unit outputs a first key identifier and a second key identifier when a plurality of the keys are simultaneously depressed; and

wherein the processor accepts the first key identifier when the plurality of the keys are simultaneously depressed while a first mode is set, and accepts the second key identifier when the plurality of the keys are simultaneously depressed while a second mode is set.

6. The equipment of claim **5**, wherein the first mode is a state expressing a selection menu, and the second mode is a state after a selection was made in the first mode.

7. The equipment of claim **5**, wherein the second mode is a music playback mode.

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